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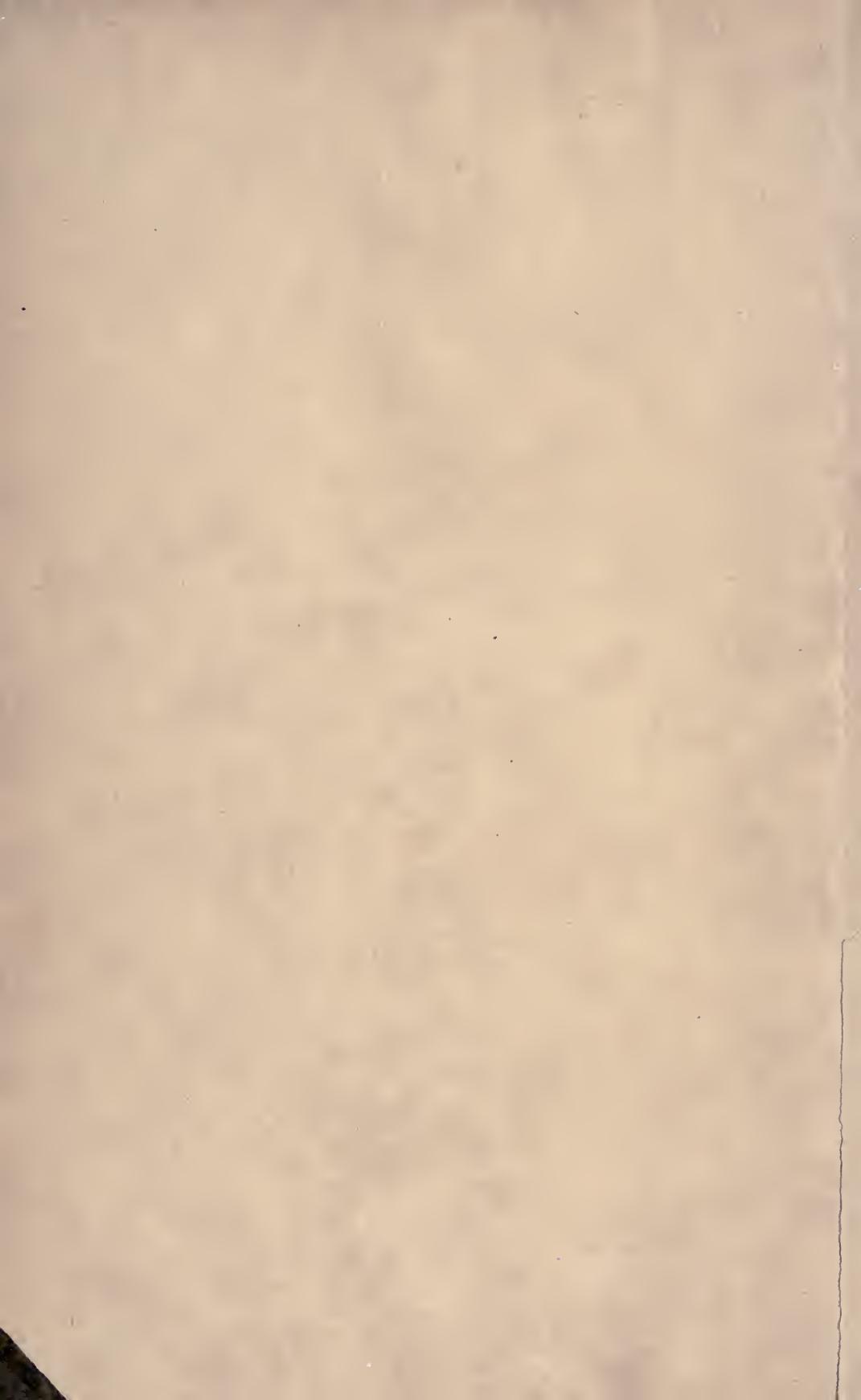
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NOTES ON A COLLECTION
OF COLD-BLOODED
VERTEBRATES

FROM THE

OLYMPIC MOUNTAINS

BY

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CHICAGO, U. S. A.

February, 1899.

NOTES ON A COLLECTION OF COLD-BLOODED VERTEBRATES
FROM THE OLYMPIC MOUNTAINS.

BY

S. E. MEEK, PH.D.

The collecting of Cold-blooded Vetebrates by the Museum's expedition to the Olympic Mountains, in 1898, was merely an incidental feature of the work of the party. All of the specimens, except the trout, were picked up from time to time by the party where it happened to be. The few days spent by Professor Elliot on Lake Crescent and Lake Southerland resulted in bringing to the Museum, in fine condition, an excellent series of trout from these lakes. In addition to the aid he has kindly given the writer in the preparation of this paper, Professor Elliot has added many valuable notes and field observations.

PISCES.

Salmo gardneri beardsleei Jordan & Seale.

Blue Back Trout of Lake Crescent. Three specimens.

Cat. No.	Length.	Head.	Depth.	Eye.	Snout.	Maxillary	Scales.	Weight.
2032....	19.75	4.00	4.66	6.00	4.50	2.00	132	2½
2033....	21.40	3.70	4.45	7.25	3.50	1.82	165	3
2030....	28.65	3.30	3.66	8.33	3.10	1.63	130	13

Our specimens, Nos. 2032 and 2030, agree well in all respects with the description as given by Jordan & Evermann. The other specimen has more scales in the lateral line. The anal fin

and first ray of pectoral fin in the largest specimen have a few black spots. Some of the scales below lateral line on middle and anterior part of the body each with a small black spot at lower part of base. The maxillary curves rather abruptly downward below the eye. Gill rakers very much longer than in the following species.

"This is a magnificent fish, and specimens have been taken (alas, in the spring and on their spawning beds with the spear!) weighing twenty-one pounds, and seventeen-pounders have been captured on a spoon hook. It will take the fly in the spring, I was told, but at other times of the year trolling a large spoon at a depth of fifty feet or more is necessary. The largest killed weighed thirteen pounds. The water of Lake Crescent is perfectly clear, and after a considerable struggle with my captive I brought the fish within ten feet of the boat and about six from the surface. As it tugged at the line with its side toward me and the fins spread out to the utmost, every scale almost was distinctly visible, and the glistening silvery side, contrasting strongly with the beautiful deep blue of the head and back, caused it to present one of the handsomest objects I had ever witnessed in angling. Its rushes were tremendous, and made the line pass through the fingers with such velocity as to cause it to burn the flesh. Dr. Jordan, in his description of this species, gives the color above 'dark green,' misled, probably, by his alcoholic specimens. The color above is, as I have already stated, a dark, rich, ultramarine blue, and this gives to the fish its trivial name of 'Blue Back.' This species is a dweller of deep water, and only comes to the surface and visits shallow water in the spring. A characteristic coloring, omitted in all descriptions of this trout that I have seen, is a broad iridescent band in the center of the tail, and extending through it to the tip. This is most beautiful, composed of brilliant metallic hues of rainbow colors, and attracts the eye immediately as the fish is taken from the water. The line of demarcation between the blue of the back and silver of the sides is as abruptly drawn and sharply indicated as if cut with a knife. Altogether it is a magnificent species." (D. G. E.)

Salmo gardneri crescentis Jordan & Beardslee.

Speckled Trout of Lake Crescent. Eight specimens.

Cat. No.	Length.	Head.	Depth.	Eye.	Snout.	Maxillary	Scales.	Weight.
2031....	11.35	4.00	4.95	5.20	4.00	1.75	150	½
2026....	13.50	3.80	4.35	5.40	4.20	1.85	156	1
2024....	14.95	3.95	5.10	6.70	3.90	1.81	160	¾
2025....	17.40	3.95	4.35	6.75	4.00	1.81	150	2
2027....	17.85	3.95	4.20	6.10	3.95	1.66	162	3
2029....	22.30	3.95	4.80	6.80	3.50	1.79	165	4½
2034....	22.70	3.50	4.40	8.00	3.40	1.85	162	5
2028....	24.89	3.50	4.10	8.00	3.20	1.53	160	7½

Our specimens agree with description of Jordan & Beardslee.

"In life this is a very brilliantly colored fish, possessing many iridescent hues, and brought to my mind in its general appearance the Weakfish of our northern salt waters, though more brilliant but without the bright-hued fins. The operculum is opalescent and very beautiful in its bright and changeable colors. This species will take a fly in the spring, and a spoon trolled at a depth of fifty feet or more in later seasons of the year. It grows to a large size, one obtained weighing eight pounds, but it has been procured weighing much more than that. Exceedingly gamey, it battles well for its life, whether on spoon or fly, and altogether is one of the finest of our fresh-water fish. There is no red under lower jaw, so conspicuous a mark on the Lake Southerland trout, and it is not so dark on the head and back, nor thickly marked with black spots as is that species." (D. G. E.)

Salmo bathœcetor, sp. nov.

Long-headed Trout. Two specimens from Lake Crescent.

Cat. No.	Total Length.	Head.	Depth.	Diameter of Eye.	Snout.	Maxillary.	Scales.	Gill Rakers.	Branchiostegals.	Dorsal.	Anal.
2036	17.05	3.80	5.75	6.75	3.33	1.68	152	{ 7 + 13 right. { 7 + 11 left.	9 right. 10 left.	10	11
2035 Type	21.10	3.50	5.10	7.60	3.33	1.64	150	{ 8 + ? right. { 7 + 12 left.	10 right. 11 left.	10	11

Body elongate, slender; head much pointed; anterior margin of upper jaw slightly above axis of the body; maxillary very long and very slender, reaching considerably beyond posterior

part of the orbit, its greatest width 7 in its length; about 24 teeth on maxillary; teeth on jaws vomer and palatines large, the dentition much stronger than in specimens of *S. g. crescentis* of same size; maxillary nearly straight in the larger specimen, but some curved in smaller specimen; mandible very strong; opercle very broad and contains the eye $1\frac{1}{2}$; preoperculum narrow, less than diameter of the eye; gill rakers very short and thick; last ray of dorsal less than half longest rays, third ray longer than base of fin; when depressed, second and third ray tips reach beyond middle of last dorsal ray; pectorals, $1\frac{8}{9}$ in head; ventrals, $2\frac{1}{2}$. Color much as in *S. g. crescentis*, except lighter. Head, body, and tail profusely spotted with black spots; ventrals and pectorals dark. No. 2036 has fewer spots, none on anal and pectorals. The anterior part of upper jaws very dark, darker than in the larger specimen. This species differs from *S. g. crescentis* in being much more slender, its back much less elevated, head more slender and pointed, gill rakers shorter, maxillary straighter, narrower, and longer. The general color pattern is the same, except that this species is less spotted and lighter. No red on the under jaw, the dentition is much stronger in this species than in *crescentis*.

"This is a deep water fish, keeping always near the bottom. Lake Crescent is of great depth, in some places over seven hundred feet, and doubtless much more in others not yet ascertained. The present species, unlike other trout, does not come to the surface, as I was informed, at any season of the year, and will not of course take a fly, or indeed a spoon, or any kind of lure. The only way it can be captured is by set lines sunk within a foot of the bottom, and it seems that there are only a few places in the lake where it can be caught even by this means. The specimens obtained were procured at a depth of about two hundred feet. While it is a brightly colored fish, it lacks some of the iridescent hues of *S. g. crescentis*, and consequently is less attractive in appearance. It is known as the long nose, or long headed trout." (D. G. E.)

Salmo clarki clarki Richardson.

One specimen, 6.10 inches in length, taken in Boulder Creek, Washington.

Salmo clarki jordani, var. nov.

Spotted Trout of Lake Southerland:

Twenty-three specimens; average length, 14.87 inches; head, 3.86; depth, 4.79; eye, 5.89; snout, 4.13; maxillary, 1.78; scales, 146.1; dorsal, 10; anal, 11,

Cat. No.	Length.	Head.	Depth.	Eye.	Snout.	Maxillary	Scales.
2001....	11.30	4.00	4.80	5.00	4.60	1.84	146
2018....	11.45	3.85	5.10	5.40	4.40	1.75	147
2017....	11.45	3.80	4.55	5.10	4.20	1.74	146
2002....	12.36	3.85	4.80	5.90	4.10	1.81	152
2000....	12.50	3.65	4.65	5.25	4.00	1.75	148
2005....	13.36	3.80	4.80	5.60	4.10	1.83	150
2016....	13.55	3.80	5.00	5.70	4.10	1.81	143
2003....	13.65	3.95	4.65	5.85	4.25	1.84	154
2014....	14.00	4.10	4.95	5.60	4.00	1.82	146
2004....	14.40	3.80	4.60	5.83	4.00	1.80	147
2020....	14.51	3.80	4.80	5.90	3.90	1.81	150
2007....	14.55	4.00	4.80	5.50	4.40	1.77	146
2023....	14.75	3.90	5.40	6.50	4.40	1.83	148
2012....	14.85	4.00	4.60	5.45	4.00	1.71	150 Type
2015....	15.05	3.75	4.45	6.20	3.95	1.68	135
2013....	15.60	4.35	4.70	5.40	4.30	1.82	148
2022....	15.85	3.95	4.75	6.00	4.20	1.77	145
2009....	16.85	3.95	4.50	5.65	3.80	1.85	147
2019....	16.90	3.80	5.25	6.20	3.75	1.82	140
2010....	17.50	3.95	5.10	6.50	4.60	1.80	145
2008....	17.80	3.95	5.40	6.50	4.45	1.81	148
2011....	19.65	3.80	4.25	7.00	3.50	1.73	138
2021....	20.30	3.15	4.43	7.50	4.00	1.74	142
Average...	14.87	3.86	4.79	5.89	4.13	1.78	146.1

Body elongate, not much compressed; head short, maxillary not extending far behind orbit; maxillary rather broad; its greatest width, $4\frac{1}{2}$ in its length, in some specimens about $5\frac{1}{2}$, a slight curve downward under the eye; dentition not so strong as in the speckled trout of Lake Crescent; gill rakers rather long, longer than in the speckled trout, but less so than in Blue Back of Lake Crescent; pectoral in head, 1.88; ventrals, 2.24; origin of dorsal, midway between tip of snout and base of caudal, or slightly nearer tip of snout; origin of ventrals, under first to third dorsal rays; margin of dorsal fin, convex; base, 1.32 in longest ray; snout bluntnish. D. 10, A. 11. Branchiostegals, 10 or 11; usually 10 on one side, 11 on the other.

Color in alcohol, dark steel blue above, paler below, becoming

nearly white on the belly. Back sides and head profusely spotted with black. Some specimens have black spots on the belly and on all fins. Usually the pectorals and ventrals are without spots. Upper half of lower jaw black, red under dentary bones. The life colors are given below by Professor Elliot.

Named for Dr. D. S. Jordan, President of Stanford University, who, more than anyone else, has studied our western trout.

"This beautiful species is exceedingly gamey, takes a fly readily even as late as October, is a great leaper when hooked, and fights a l'outrance. In appearance it resembles *S. g. crescentis* of the neighboring lake, being fully as brilliantly colored, but can be at once distinguished by its orange or orange-red fins, red on the jaw, and the number and blackness of its spots, and darker back and top of head. In general appearance there is not the slightest similarity between this species and the specimen from Boulder Creek. At no stage of its existence that I have seen, from fingerlings to fish weighing over four pounds, is there any silvery luster, but the colors are all bright hued, some even metallic. It is one of the most active of its tribe, and I have had them leap after taking the fly in such quick succession, and with such rapid dartings about the lake, that it was impossible to imagine where they would next appear. I believe it spawns in the spring, as in the middle of October, when I left Lake Southerland, the eggs of the females we caught were not enlarged, and no indication of the approach of the spawning season." (D. G. E.)

***Salmo clarki declivifrons*, var. nov.**

Salmon Trout of Lake Southerland. One specimen from Lake Southerland.

Cat. No. 2006. Total length, 9.64 inches; head, $3\frac{1}{2}$; depth, $4\frac{1}{2}$; eye, $5\frac{1}{2}$ in head; snout, $4\frac{1}{2}$; maxillary, $1\frac{2}{3}$; scales, 148; dorsal, 10; anal, 11; branchiostegals, 10; gill rakers, $7+10$.

Body elongate, back elevated, anterior profile much decurved, especially so from nape forward. Tip of snout below axil of the body; margin of the upper lip on a level with lower margin of the orbit; gape of mouth nearly horizontal, more so than in other trout; maxillary broad, its greatest width 5 in its length, its posterior border reaching beyond eye; dentition strong; posterior margin of dorsal fin straight; when the fin is depressed the tip

of second ray reaching middle of last ray; last ray, $2\frac{1}{2}$ in longest ray; pectorals, $1\frac{3}{8}$ in head; ventrals, $2\frac{1}{4}$.

Color dark blue above and on sides to lateral line anteriorly, and to a short distance above lateral line posteriorly, then becoming abruptly silvery; belly nearly white, no spots on head or body, none on any of the fins, except a few on caudal fin; upper margin of lower jaw black, a dark blue patch on cheek, extending obliquely upward and backward to near top of opercle; pectorals, ventrals, and anal yellowish.

The general color of this specimen much resembles the Blue Back of Lake Crescent. It is some darker, has no spots, except on caudal fin, and the upper anterior profile is much more curved.

"This trout is occasionally taken in Lake Southerland, and is called the 'Salmon trout.' It is easily recognizable, not only by the sharply curved upper outline of the fore part of the body, but also by its quite different style of coloration, resembling, as stated above, somewhat the style of the Blue Back of Lake Crescent. As there is no water connection between these lakes, and Lake Southerland is seventy-five feet lower than Crescent, and, moreover, the fish of that lake have no communication with the sea, on account of a very high precipitous fall a short distance from its outlet, it cannot be supposed that these two forms are in any way identical. Out of a large number of trout taken by me in Lake Southerland, only two or three specimens of this form were procured, and they were all of small size, and I did not understand that it was ever obtained of much greater dimensions than those given above. This could not be the fault of the lake, which is exceedingly deep, and nearly three miles in length.

It is a gamey fish, takes the fly, leaps out of water, and is a good fighter for its size." (D. G. E.)

Cottus asper Richardson.

Bull head from Lake Southerland.

Six specimens, ranging in length from 5.5 inches to 7.4 inches; skin smooth, except a few prickles along lateral and under pectoral fin; vent nearer base of caudal (midway between eye and base of caudal) than tip of snout.

Hemilepidotus hemilepidotus Tilesius.

One specimen from Port Angeles.

Podothecus acipenserinus Tilesius.

One specimen, $7\frac{1}{4}$ inches in length, from Port Angeles, Wash.; caught in the harbor.

AMPHIBIA.**Plethodon intermedius Baird.**

Three specimens, $4\frac{1}{4}$, $2\frac{3}{4}$, $2\frac{3}{4}$ inches in length respectively. The larger specimen has the dorsal band well developed; this band belongs to the epidermis, and disappears with its loss, barely leaving a trace. In life this band was yellow. In addition to the three adult specimens, several larval forms were taken.

"Salamanders were quite plentiful in this lake, which is a small body of water situated above altitude of about 5,000 feet, and which flows into Fuca Straits by devious ways not always commendable or satisfactory, especially should one desire to follow them. This little creature when taken from the water appeared to be about the consistency of jelly, and threatened to disappear entirely when handled, but fortunately hardened in formalin. They were quite abundant in certain places near the shore where a brook flowed into the lake, and generally rested motionless on the bottom, from which we seized them with our hands. When disturbed, they scurried rapidly along, and either disappeared in cloudy water, caused by the mud put into motion by their movements, or else by burying themselves under stones or debris of various material lying on the bottom." (D. G. E.).

Rana agilis aurora B. & G.

One specimen, 3.28 inches in length.

Heel reaching to center of the orbit, black ear patch indistinct.

Rana temporaria pretiosa B. & G.

Nine specimens, Happy Lake, Wash.; 5,000 feet. These specimens vary much in coloration.

- a. Length, 2.11 inches; no black blotches, a few warty protuberances on back and sides; light stripe on margin of upper jaw, which extends back to arm; brownish ear patch and a brown stripe forward from each eye; bottom of feet and buttocks granulated; belly plain, no dark mottlings under the head.
- b. Length, 2.29 inches; color as in a, with a few small inky blotches on back; faint brownish bands on tibia and foot.

- c. 2.04; color same as *b*, only one faint ink spot on right side; back nearly smooth; sides with more warts than on *a* and *b*.
- d. 2.15 inches in length; same color as preceding, except the back and top of head has many black blotches, some as large as pupil; under parts a little lighter than in preceding; brown cross bars on legs very faint.
- e. 1.93 inches in length; darker than in preceding; a few very small dark blotches or dots on back; under surface plain; cross bars on legs more distinct than in preceding; warty protuberances on back and sides.
- f. 2.15 inches in length; color same as *d*, except much darker, and brown marblings on under surface of the head; bars on legs moderately distinct.
- g. 1.95; color same as *e*, except slightly darker; buttocks dark brownish, much speckled with white; sides darker than back; lower part of sides much mottled with white; under surface of head white; warty as in preceding.
- h. 2.15 inches in length; much darker than any of the preceding; black blotches on back and upper part of sides; under surface of head and breast mottled with darker; cross bars on the legs not plain.
- i. 2.45 inches in length. This specimen is darker than any of the preceding; under surface of head much mottled with blackish.

Size seems to have little or no relation with color, as shown by these specimens. The largest is the darkest; *h* and *d* are same size, and present nearly opposite degrees of coloration, while *f* of same size is intermediate between the two. These specimens would suggest at least a darker coloration, with increase of size, a condition quite the opposite of that recorded by Dr. Test.*

"This frog was first found in Happy Lake itself, but afterwards in greater numbers in small, shallow water holes in swampy ground, about a mile from the lake. It seemed to be the only species in the vicinity." (D. G. E.)

Bufo columbiensis B. & G.

One specimen; body, 3.6 inches in length; belly profusely spotted with black; vertebral line very distinct.

"This curious frog-like toad was captured in the road about

* Bull. U. S. Fish Com., 1891-51.

a mile from the banks of the Elwah river, and some seven miles from Port Angeles. Unlike the generality of toads, it takes readily to the water, in which its long, slender, webbed, frog-like hind feet are admirably adapted. It grows to a large size, and the bold markings of the belly make it a very conspicuous object." (D. G. E.)

REPTILIA.

Thamnophis pickeringi B. & G.

Cat. No.	Total Length.	Length of Body.	Length of Tail.	SCALES.	UPPER LABIALS.		Labials Entering Eye.	LOWER LABIALS.		Preorbital.	Postorbital.	Temporals.
					Right.	Left.		Right.	Left.			
487	18.55	14.12	4.43	19, 165, 80	7	7	3 & 4	10	10	1	3	1-2
488	?	11.87	?	19, 155, ?	8	8	4 & 5	9	10	1	3	1-2
489	23.89	18.70	6.19	19, 166, 81	8	8	4 & 5	10	9	1	3	1-2

Preorbital retains its width to middle of orbit, then slightly narrows ; middle postorbital slightly the larger. No. 489 has a small scale just behind lower and middle postorbital, evidently a part of first temporal ; head is fairly well differentiated from the body ; lower row of scales on each side larger than on second, especially on middle portion of the body, only a few being slightly carinated ; most of the scales on tail carinated.

Color in alcohol, dark greenish above, bluish below ; a dorsal bluish band covers one, and half of two other rows of scales ; lateral stripe on 2d and lower half of 3d row of scales. These three stripes less prominent on the posterior part of the body, and disappear on the anterior half of the tail. About 76 orange bars on body, which do not extend on the tail ; these bars are irregular, about one scale wide, and on 3d, 4th, 5th, and 6th rows of scales. Very few can be seen on No. 489. No stripe behind the eye, and no black spots on the body ; belly not marbled with darker.

"Snakes are not common in the Olympic Mountains, and no poisonous species is found there. The specimens given in this paper are all the species we saw, and were taken at various heights—from 500 to 5,000 feet—and it is probable that they represent all that inhabit at least that portion of the range explored by myself and party." (D. G. E.)

Thamnophis leptocephala olympia, var. nov.

One specimen, Cat. No. 486; total length, 21.84 inches; body, 16.15; tail, 5.09; scales, 17 rows; gasterosteges, 144; urosteges, 56; one preocular; three postoculars, the middle one the larger; 7 upper labials, the 3d and 4th entering the eye, the 5th the largest; 9 lower labials, the 5th the largest; temporals, 1-2; length of frontal equals its distance from the rostral; rostral broader than deep, only its tip seen from above; the suture between the prefrontals extends to middle of the frontal. The preorbital is broadest at upper part of orbit, and narrows downward. Scales on the body carinated, except the lower row on each side, which have only a few scales faintly carinated. Scales of the outer rows very little larger than on second rows on anterior and posterior parts of the body, the difference being greater on the middle of the body. Head rather small, and not very distinct from the body. Nearly all of the scales of the tail carinated, only those of lower row, and most on last third of tail not keeled; color in alcohol, a dark green, no light dorsal or lateral stripes; head, same color of the body. A dark stripe from eye, back on 4th and 5th rows of scales; this band breaks into small irregular spots, which are scarcely traceable on sides, only a short distance. Very little black appears on the scales, except near the head. A few scales on sides have dark edges; belly uniformly greenish, anteriorly, becoming marbled, with small dark spots, posteriorly; these dark spots disappear on under surface of posterior half of tail.

This variety differs from *Thamnophis leptocephala*, in having one preorbital, most of the scales on the tail keeled, no small dark spots in a series from head to tail. The scales are in 17 rows; there are no dorsal or lateral stripes.

Thamnophis rubristriata sp. nov.

One specimen, Cat. No. 485; total length, 20.62 inches; body, 15.37; tail, 5.25; scales, 17, 151, 67; preoculars, 2; postoculars, 3; the postoculars subequal in size, middle one slightly larger; upper labials, right side, 8; left, 7; the second and third on right side corresponds to second on left; the one articulating with lower postorbital, the larger; frontal equals its distance from tip of snout; temporals, 1-2; lower row of scales on each side the larger, few near middle of the body being slightly keeled. The difference

in size between the lower row of scales and second is more pronounced in middle of body. Most of the scales on tail keeled; those of the lower row as well as most on the last fourth smooth.

Ground color, light greenish below; dark above; in life, under surface red; a broad, red dorsal band covering nearly three rows of scales; most of the scales on the sides with small red dots on upper and lower edge of each scale, the intervening spaces black; a dark stripe behind eye, which extends a short distance on fifth row of scales, and then breaks up and disappears a short distance from head; a lateral greenish stripe on second and third rows of scales, this narrows to the second and half of third row near end of body, and disappears on anterior portion of the tail. In life, the posterior part of the body, and most of the anterior is bright red; anterior border of most of the gasterosteges black on lateral portions only; belly not marbled after the red has faded; small yellow dots between parietals.

This species has the general build and appearance of the preceding. It, however, has two preorbital and dorsal and lateral stripes, which, with the bright red on belly, back and sides, becoming more intense posteriorly, are its chief distinguishing characteristics.





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